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Wastewater Regionalization Preliminary Engineering Study

For the communities of Harrisburg, Tea, and Worthing, SD

April 4, 2016

Communities Share a Common Problem

- Each is outgrowing their wastewater treatment system and considering
  - Expansion of their own system
  - Regionalization with Sioux Falls
- Another option to consider
  - Regionalization with other communities

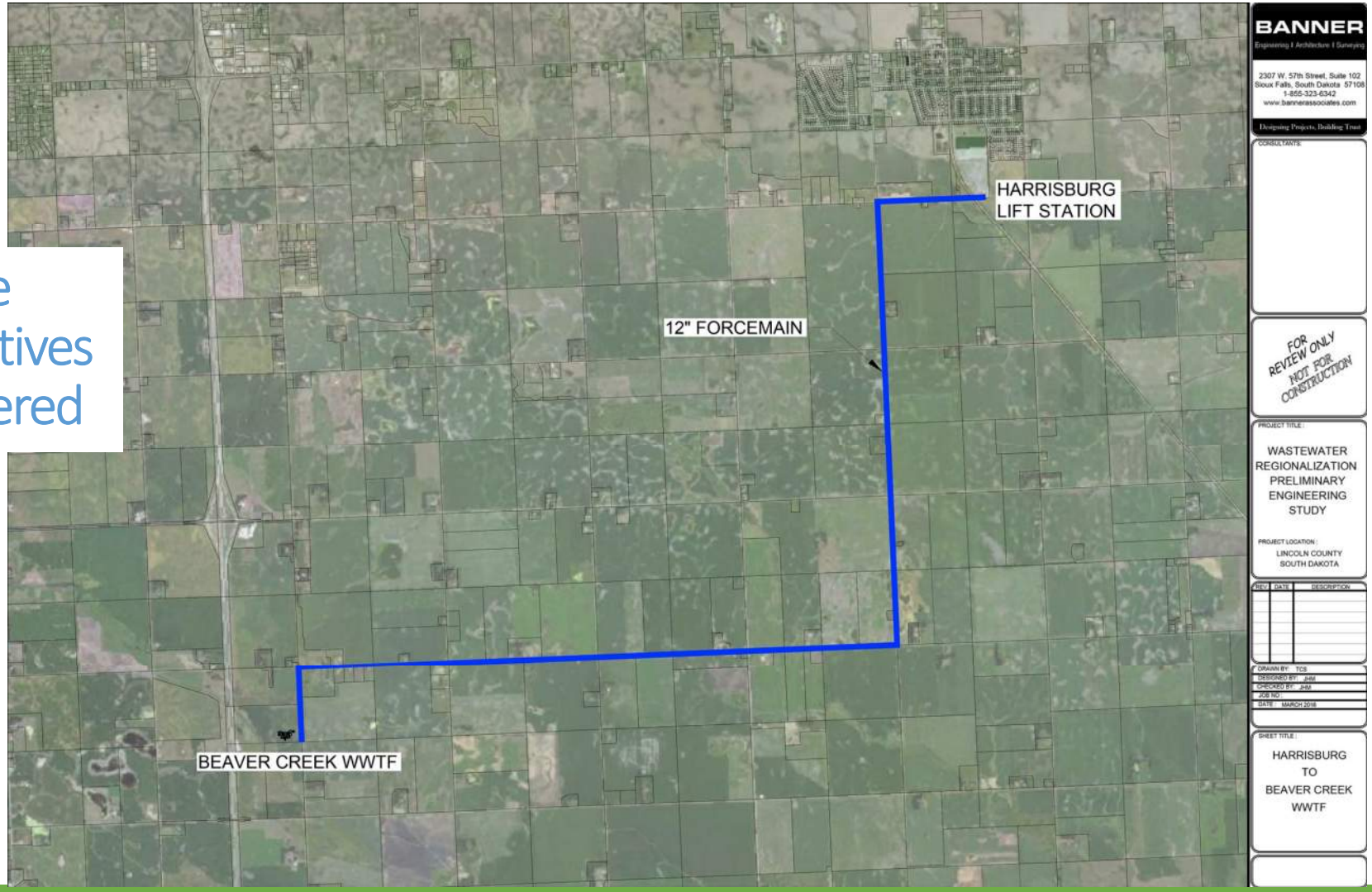
Projected Wastewater Flows

Year	TEA		HARRISBURG		WORTHING		RURAL LINCOLN COUNTY		REGIONAL TOTAL	
	Pop.	Flow (gal/day)	Pop.	Flow (gal/day)	Pop.	Flow (gal/day)	Pop.	Flow (gal/day)	Average Day Flow (gal/day)	Peak Day Flow (gal/day)
2015	4,888	586,560	4,908	490,800	1,000	100,000	1,000	100,000	1,277,360	1,916,004
2020	6,359	763,080	5,971	597,100	1,217	121,700	1,338	133,800	1,615,680	2,423,508
2025	8,106	972,720	7,265	726,500	1,480	148,000	1,791	179,100	2,026,320	3,039,446
2030	9,874	1,184,880	8,839	883,900	1,801	180,100	2,397	239,700	2,488,580	3,732,735
2035	11,642	1,397,040	10,767	1,076,700	2,191	219,100	3,207	320,700	3,013,540	4,520,367
2040	13,400	1,608,000	13,100	1,310,000	2,666	266,600	4,292	429,200	3,613,800	5,420,543

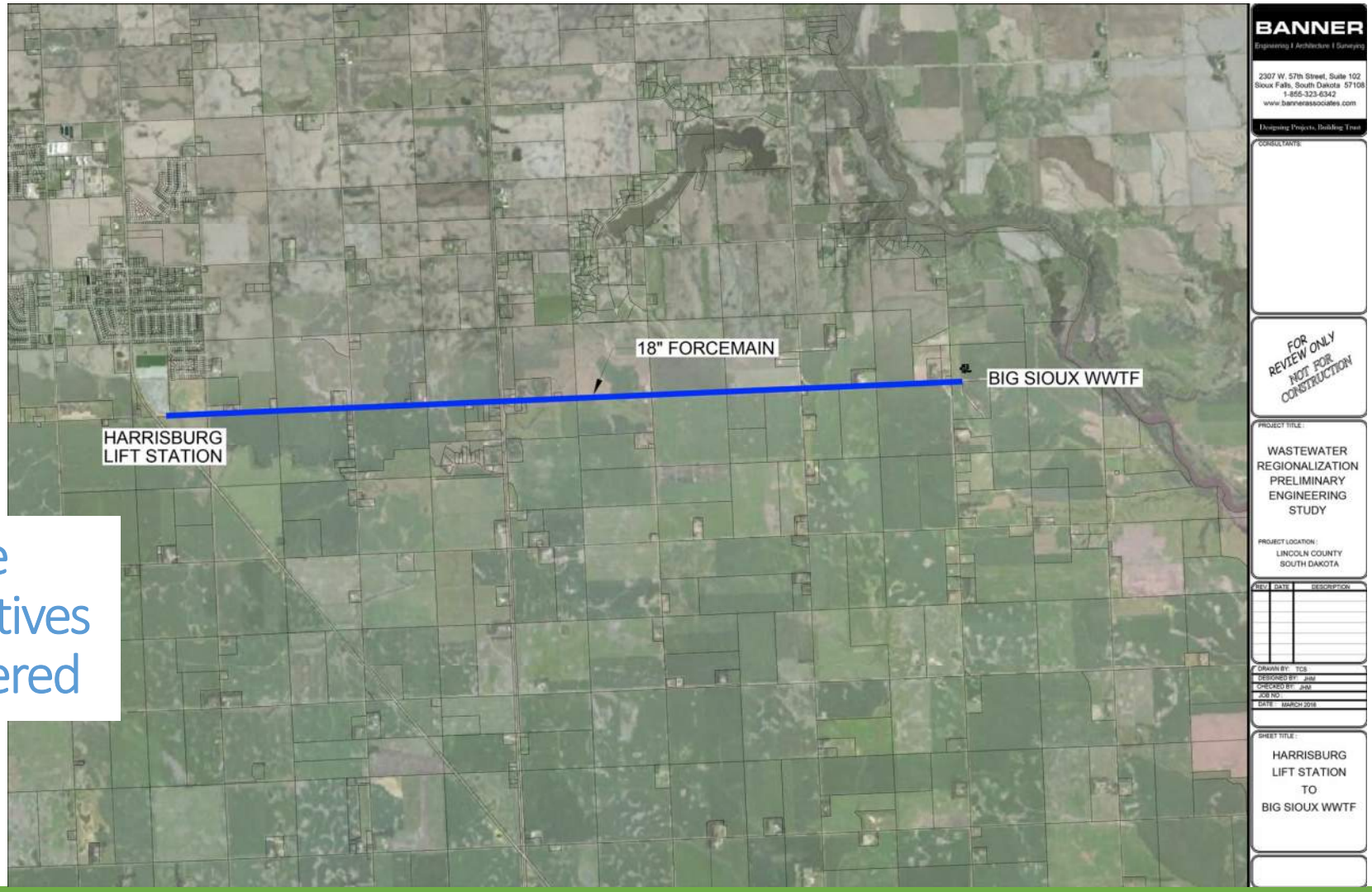
Treatment Alternatives Considered

- Wastewater Plant near Worthing
  - Discharging to the Beaver Creek
  - Activated Sludge Process
- Wastewater Plant east of Harrisburg
  - Discharging to the Big Sioux River
  - Sequencing Batch Reactor

Pipeline Alternatives Considered



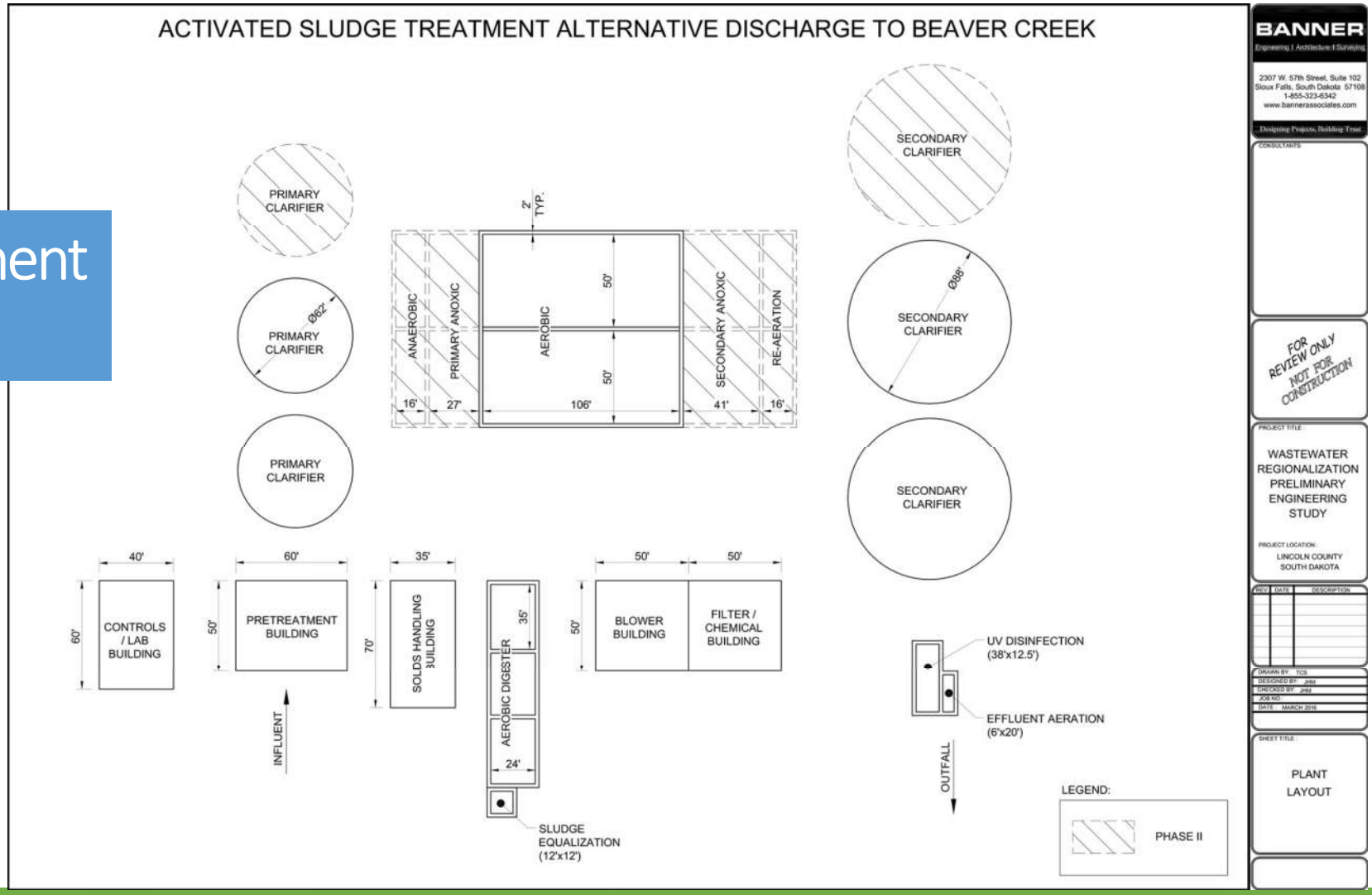
Pipeline Alternatives Considered



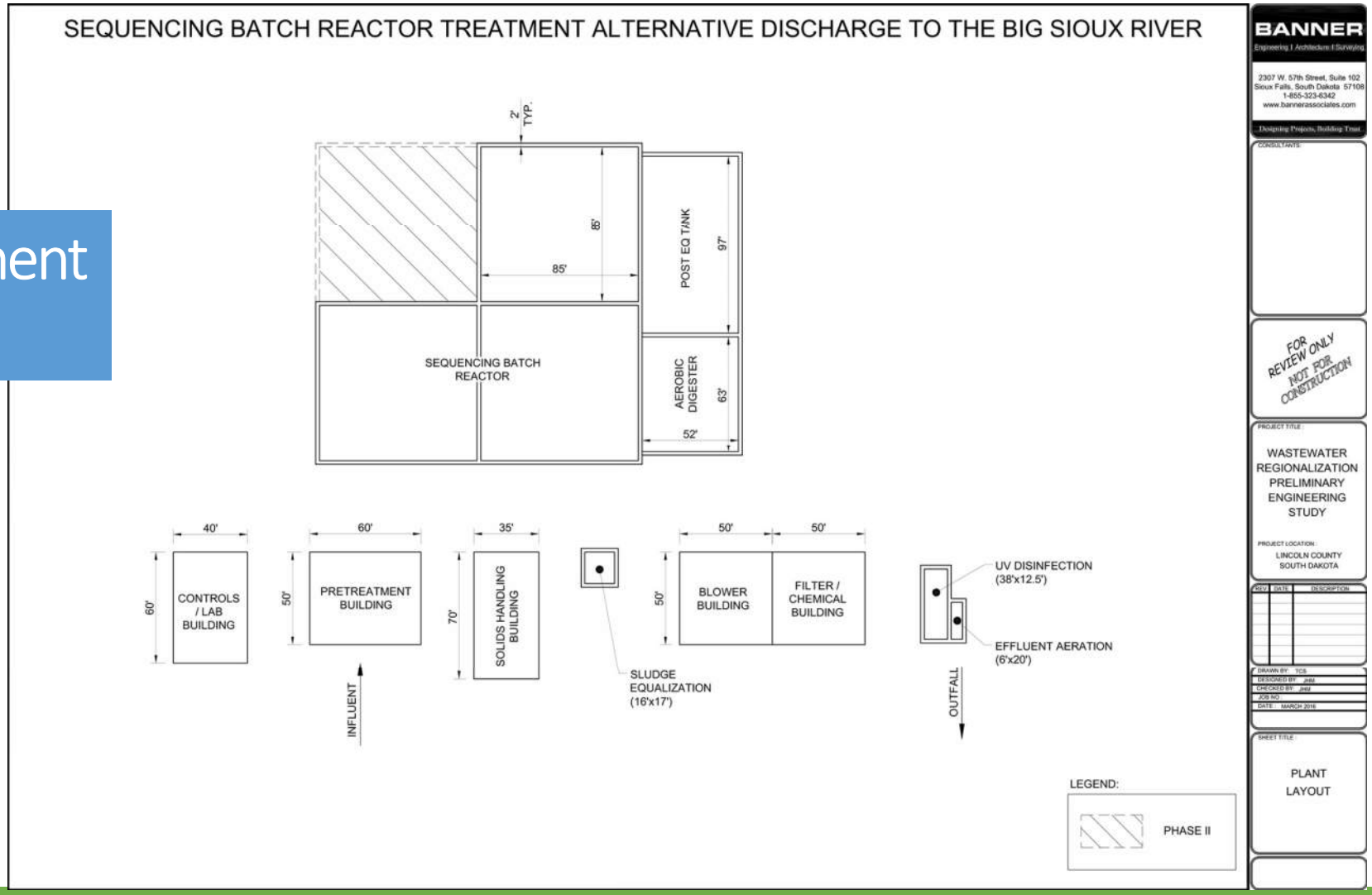
Phasing for Treatment Alternatives

- Build plant to meet projected 2040 needs
- Construct in two phases due to the significant population increase that is projected
  - **Phase I** - Construct to meet 2030 needs
  - **Phase II** - Plant expansion to meet 2040 needs
    - Add treatment to meet anticipated nitrogen and phosphorus limits.

Treatment Exhibit



Treatment Exhibit



Capital Cost for Regional Wastewater

	SBR Phase I & II	SBR - No Phasing	Activated Sludge Phase I & II	Activated Sludge No Phasing
Treatment Plant Costs	**$ 29,819,100**	**$ 30,238,800**	**$ 39,802,400**	**$ 36,085,400**
Force Main/ Outfall Costs	**$ 35,470,669**	**$ 35,470,669**	**$ 25,811,679**	**$ 25,811,679**
Total Construction Costs	**$ 65,289,769**	**$ 65,709,469**	**$ 65,614,079**	**$ 61,897,079**

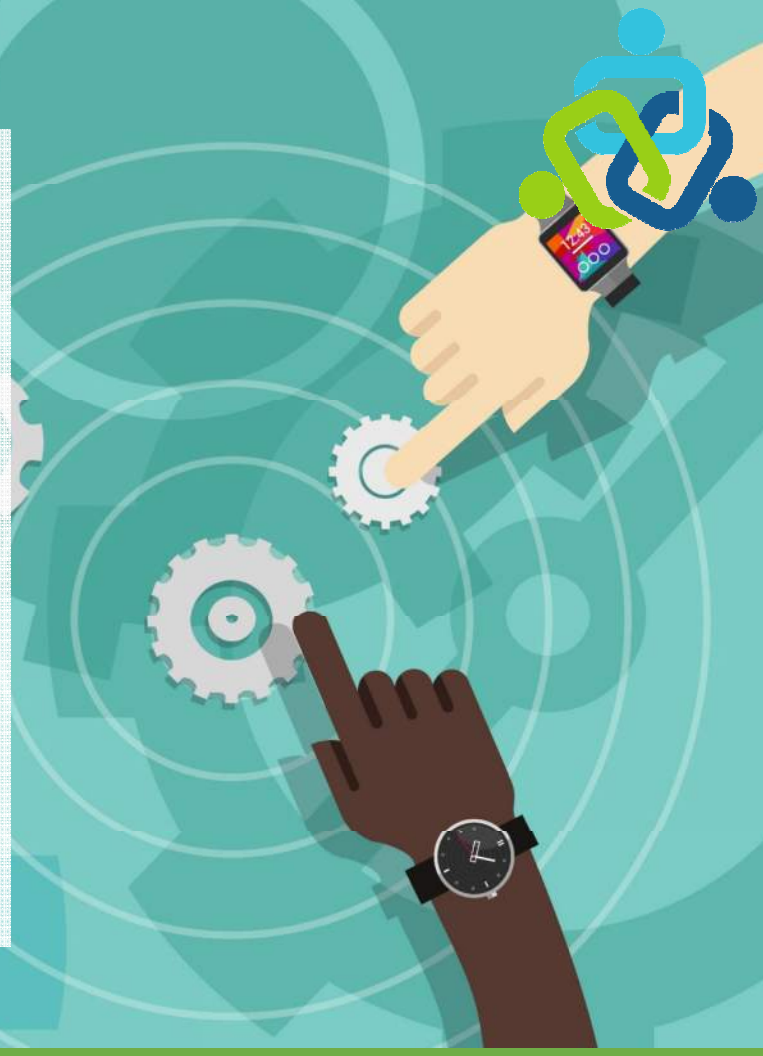
Are the WWTP costs realistic?

	Peak Capacity (MGD)	Cost Adjusted to 2016 per ENR Index	Treatment Plant Construction Cost per Gallon
Regional WWTP Alternatives			
SBR Phase I&II	5.40	$ 29,819,100	$ 5.52
SBR - No Phasing	5.40	$ 30,238,800	$ 5.60
Activated Sludge - Phase I&II	5.40	$ 39,802,400	$ 7.37
Activated Sludge - No Phasing	5.40	$ 36,085,400	$ 6.68
Lennox WWTP	0.67	$ 3,928,572	$ 5.86
CostWorks Packaged WWTP	5.00	$ 30,750,000	$ 6.15

Intent of Study

Scope included comparing:

- Cost of regional wastewater plant
- Cost of regionalization with Sioux Falls
- Cost of recommended treatment alternative in each community's report



Sioux Falls Regionalization | Volume Charge

- Base charge = $15.60 per month
- Volume charge of $4.01 per 1,000 gallons
  - Equalization credit = $0.44 per 1,000 gallons for 30 days of available storage
  - Treatment credit of $0.55 per 1,000 gallons
- Rates and treatment credits were assumed to increase 3% annually to account for inflation.

Sioux Falls Regionalization | SDC

WATER METER SIZE (INCH)	REGIONAL WASTEWATER SYSTEM DEVELOPMENT CHARGE (PER METER)
5/8” to 3/4”	$ 2,391
1”	$ 5,978
1 ½”	$ 11,954
2”	$ 19,127
3”	$ 35,863
4”	$ 60,000

Sioux Falls Regionalization | Cost to Connect

WATER METER SIZE (INCH)	CITY OF HARRISBURG, SD		CITY OF TEA, SD		CITY OF WORTHING, SD	
	NUMBER OF METERS	SYSTEM DEVELOPMENT CHARGES	NUMBER OF METERS	SYSTEM DEVELOPMENT CHARGES	NUMBER OF METERS	SYSTEM DEVELOPMENT CHARGES
5/8" to 3/4"	1,714	$4,098,174	1,374	$3,285,234	348	$832,068
1"	29	$173,362	30	$179,340	0	$0
1 ½"	11	$131,494	53	$633,562	0	$0
2"	21	$401,667	10	$191,270	2	$38,254
3"	3	$107,589	2	$71,726	0	$0
4"	1	$60,000	7	$420,000	0	$0
Totals	1,779	**$4,972,286**	1,476	**$4,781,132**	350	**$870,322**
Additional Force Main Cost for Sioux Falls Connection/Extension		**$3,736,736**		**$6,530,879**		**$7,955,612**

Total Cost for Communities to Connect is $28.8 Million

Recommended Alternatives in Prior Studies

Water/Wastewater Master Plan Update

- Regionalization with Sioux Falls
- Lowest capital cost at $10.18 million (March 2014)

TEA South Dakota
A GROWING TRADITION

Wastewater Facilities Plan

- Total Retention
- Lowest capital cost at $11.040 million (Dec. 2014) for a population of 10,353

CITY OF HARRISBURG SOUTH DAKOTA

Wastewater Facility Plan

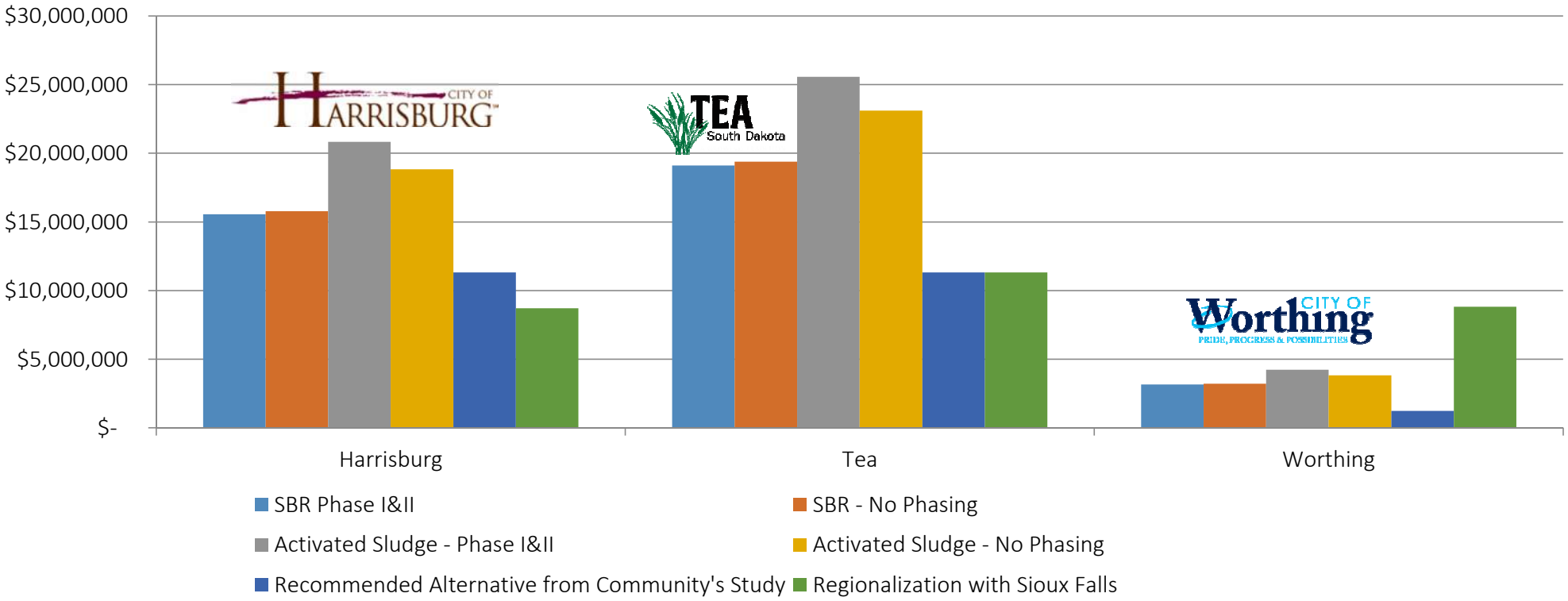
- Expansion of lagoons
- Lowest capital cost at $0.934 million (Jan. 2006)

CITY OF Worthing
PRIDE. PROGRESS & POSSIBILITIES

Challenges Comparing Costs

- Tea study didn't include annual SDC costs in Sioux Falls regionalization option
  - Report indicated that cost would be paid by developers
- Difficult to determine design flows from the Harrisburg Study
- Difficult to compare mechanical plant against lagoon system
  - Mechanical plant achieves a much higher level of treatment

Comparison of Capital Construction Costs

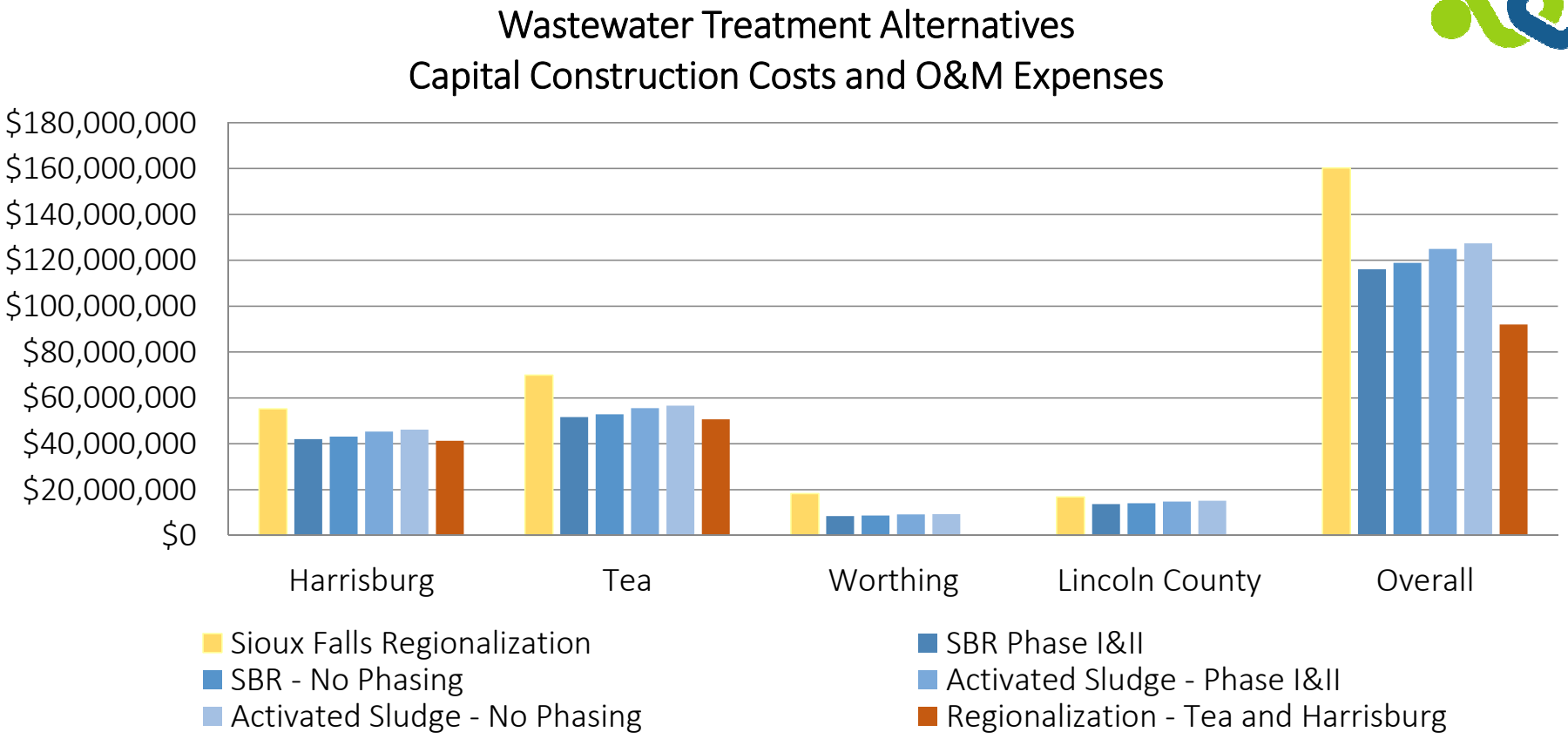


What can we compare?

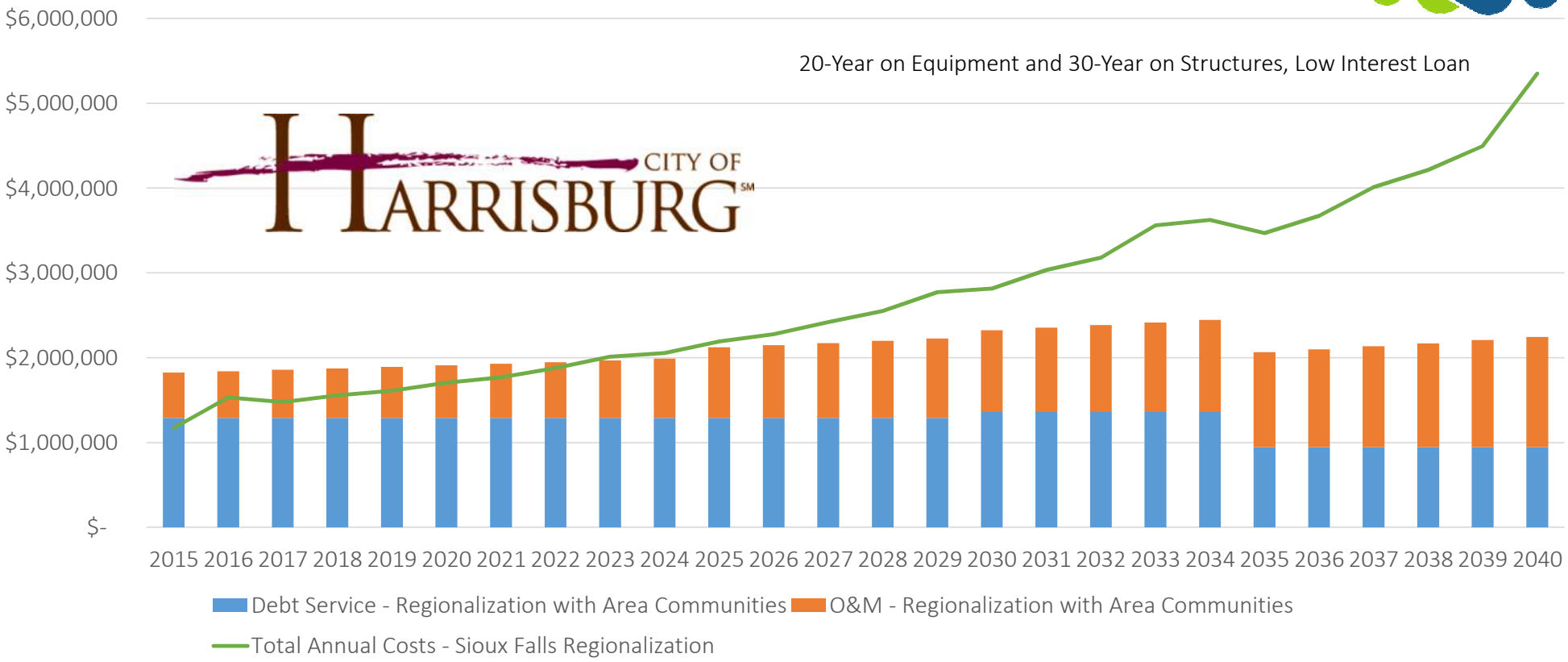
Present worth Analysis Comparing

- Capital construction costs and O&M cost over 25 year planning period
  - Regional treatment plant serving area communities from this study
  - Regionalization with the City of Sioux Falls

Present Worth Comparison



Annual Cost | Harrisburg



Summary

- Regionalization with area communities is a viable solution for wastewater treatment
  - It is more cost effective than regionalization with Sioux Falls
  - It will likely be more cost effective for Tea and Harrisburg
  - It may be cost effective for Worthing, depending on the WWTP location

Recommendations

- Further discussion on regionalization with area communities
- Further study to review full cost of communities treating wastewater on their own
  - Include life cycle analysis with O&M costs
  - Compare alternatives on a present worth basis

Thank you for your time

We welcome any questions you have

CITY OF HARRISBURG

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BANNER